

REMARKS

With claims 10-49 previously pending, claims 41 and 43 have been cancelled and new claims 50-51 have been added as shown above.

Section 103 Rejection

Claims 10-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fullowan (U.S. 5,176,792) in view of Moslehi (U.S. 5,192,849). The rejection is repeated from the previous Office Action mailed January 23, 2003. Further, the Examiner's Response to Applicants' Arguments are repeated from the previous Office Action.

In particular, the Examiner states Fullowan teaches depositing a titanium hard mask over a tungsten layer, as described in Applicants' claims but fails to teach providing energy to the reactor. The Examiner further indicates it would be obvious to combine Fullowan with Moslehi which teaches the step of providing energy since it discloses a plasma chuck which can operate in the range of -150 to 750 degrees Celsius. The Examiner states the purpose of combining Fullowan with Moslehi is to provide energy to improve the reactive ion etch rate of the material being etched.

Applicants have responded by indicating Fullowan deposits titanium onto the sidewalls of tungsten, so then it would not be desirable to slow the etch rate of the titanium mask since titanium coating of the tungsten sidewalls will prevent undercutting of the tungsten. The Examiner then replied that combining with Moslehi is still desirable since heating as disclosed in Moslehi would still improve the reactive ion etch rate.

In addition to previous remarks, this rejection based on Fullowan in view of Moslehi is further traversed by Applicants as provided to follow.

First, although heating described in Moslehi improves the reactive ion etch rate with some etches, the overall time period for etching is increased with heating. It takes time to heat up the reaction chamber for processing, and then cool the chamber after processing before removing a completed part. The increased time for heating and cooling the chamber will likely be significantly longer than the slower ion etch rate that is provided without heating. Thus, a person of ordinary skill reviewing Fullowan would not likely combine it with the teachings of Moslehi due to increased processing time (rather than decreased as indicated by the Office Action) without reference to Applicant's disclosure.

Second, claims 16, 17, 20, 44, 48 and 51 claim exposing the mask to a stream of oxidizing gas as part of the oxidation process to increase the oxidation rate of the hard mask to slow erosion in addition to increasing temperature. Neither Fullowan nor Moslehi are believed disclose introducing such a stream of oxidizing gas to enhance the oxidation process.

New claim 50 claims that the hard mask is not provided on the sidewalls of the layer to be etched in contrast with the disclosure of Fullowan.

In light of these amendments and remarks, claims 10-40, 42 and 44-51 are all believed allowable as nonobvious under 35 U.S.C. § 103 over Fullowan in view of Moslehi. Accordingly, reconsideration and allowance of these claims is respectfully requested.

Respectfully submitted,

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